Name:

at1124exam: Radicals and Squares (v926)

Question 1

Simplify the radical expressions.

$\sqrt{75}$	$\sqrt{28}$	$\sqrt{45}$
$\sqrt{5 \cdot 5 \cdot 3}$	$\sqrt{2 \cdot 2 \cdot 7}$	$\sqrt{3 \cdot 3 \cdot 5}$
$5\sqrt{3}$	$2\sqrt{7}$	$3\sqrt{5}$

Question 2

Find all solutions to the equation below:

$$2(x+9)^2 + 10 \;=\; 42$$

First, subtract 10 from both sides.

$$2(x+9)^2 = 32$$

Then, divide both sides by 2.

$$(x+9)^2 = 16$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 9 = \pm 4$$

Subtract 9 from both sides.

$$x = -9 \pm 4$$

So the two solutions are $x = -5$ and $x = -13$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 12x = 64$$

$$x^2 + 12x + 36 = 64 + 36$$
$$x^2 + 12x + 36 = 100$$
$$(x + 6)^2 = 100$$
$$x + 6 = \pm 10$$
$$x = -6 \pm 10$$
$$x = 4 \quad \text{or} \quad x = -16$$

Question 4

Any quadratic function, with vertex at (h, k), can be expressed in vertex form:

$$y = a(x - h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 5x^2 + 40x + 73$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 5 .

$$y = 5(x^2 + 8x) + 73$$

We want a perfect square. Halve 8 and square the result to get 16 . Add and subtract that value inside the parentheses.

$$y = 5(x^2 + 8x + 16 - 16) + 73$$

Factor the perfect-square trinomial.

$$y = 5((x + 4)^2 - 16) + 73$$

Distribute the 5.

$$y = 5(x + 4)^2 - 80 + 73$$

Combine the constants to get **vertex form**:

$$y = 5(x + 4)^2 - 7$$

The vertex is at point $(-4, -7)$.